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Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: Hells Canyon Hydroelectric Project—Adams and Washington Counties, Idaho and Baker, Malheur and Wallowa Counties, Oregon—Letter of Request
14420-2010-CPA-0098 FERC 1971

Dear Secretary Bose,

The U.S. Fish and Wildlife Service (Service) is writing to the Federal Energy Regulatory Commission (Commission) to request your engagement with the Service, the Idaho Power Company (Company), and other stakeholders to help expedite the development of a final licensing action for the Hells Canyon Hydroelectric Project (Project). The Project, located on the Snake River border between the states of Idaho and Oregon was originally licensed to the Company by the Commission in 1955. The license expired 5 years ago, however relicensing negotiations have currently spanned more than 10 years. A key component for the Company's relicensing is Clean Water Act 401 Water Quality Certification from both Idaho and Oregon. Without this certification, proposed facility upgrades which would provide for needed mitigation measures are unable to be implemented. These mitigation measures include Total Dissolved Gas abatement structures at all three Project dams (Hells Canyon, Oxbow, and Brownlee); critically important fish passage improvements for anadromous and resident Fish and Wildlife Service; and wildlife habitat, recreational, and cultural mitigation and enhancement measures.

Clean Water Act (CWA) 401 Certification

The Company submitted its first water quality certification in 2003. That original application and several others have been withdrawn due to lack of agreement between the States and the Company on how compliance with water temperature standards can be achieved downstream of Hells Canyon Dam (the most downstream dam). Two proposals currently exist that address the temperature compliance issue. First, the Company has proposed a comprehensive upstream mitigation program (TEMP) addressing Snake River watershed degradation issues. The intent of the program is to achieve temperature compliance at Hells Canyon Dam through a series of upstream watershed improvements. The second proposal is for a selective water withdrawal structure or temperature control

structure (TCS) at Brownlee Dam (the uppermost dam with the largest reservoir capacity) designed for cold water withdrawals from Brownlee Reservoir to address downstream temperature compliance needs. Both proposals have merit, but a full understanding of the design, use, impacts, and benefits to all Project aquatic resources are unclear at this time. Especially important to the Service are impacts and benefits to those species with Endangered Species Act (ESA) protection, most notably, bull trout (*Salvelinus confluentus*).

Given different support for each of the two proposals outlined above, and lacking agreement on how to effectively reach temperature compliance for the Project while maintaining adequate resource protections, the licensing process of the Hells Canyon Project has stalled in the absence of an effective collaborative settlement process. Stakeholders potentially interested in such a process are the Company, Federal and State Regulatory Agencies, Tribes, Non-Governmental Organizations, private water organizations and other interested parties.

The Nez Perce and Umatilla Tribes, the Columbia River Intertribal Fish Commission (CRITFC), and the Environmental Protection Agency (EPA) have been closely monitoring the CWA 401 Certification process. They have consistently asked for water quality improvements as part of the Project's relicensing process. We have enclosed a copy of a November 12, 2009, letter to Oregon Governor Kulongoski on the subject of the Company's most recent CWA 401 application. The letter is from the CRITFC on behalf of the Umatilla and Nez Perce Tribes and it advocates for the Brownlee Reservoir TCS and requests the State of Oregon to exercise its authority in the CWA to "add flexibility to Dworshak temperature control operations giving the region more control over cooling the lower Snake River, and more accurately and fairly assigning the cooling mitigation burden."

Currently there is insufficient information to fully evaluate potential impacts of a TCS. Considerations include, but are not limited to, the following:

1. Changes to currently proposed Project operations and water quality conditions within and downstream of Brownlee Dam.
2. Downstream thermal effects to resources from hypolimnetic releases from Brownlee Reservoir.
3. Coordinated release analysis with river and reservoir operations on the Snake River, including the Clearwater, Salmon, and Grande Ronde River basins.
4. Potential long-term effects to Brownlee Reservoir's cold water pool from global climate change.

All of these factors are integral to long-term planning and the recovery of bull trout and several listed anadromous salmonid species.

Endangered Species Act

To date, the Service has been working with the Company (acting as the Commission's designated non-Federal representative) informally on ESA section 7 compliance issues

for the Project. However, the Service cannot complete formal consultation with the Commission until the Hells Canyon CWA 401 process is completed. The CWA 401 certification is a critical component regarding the description of the final action and the subsequent analysis of potential effects on listed, threatened, and candidate species affected by the Project. In its Staff Alternative for the Hells Canyon Project, the Commission decided against a TCS. If the States certify a compliance program for the new Project license that was not included and analyzed in the Hells Canyon Final Environmental Impact Statement (FEIS) Staff Alternative, further delays regarding ESA compliance and the licensing of the Hells Canyon Project will likely occur. If this were to happen, the Commission may need to supplement and reanalyze its FEIS for the Hells Canyon Complex, and the Service will need to evaluate a changed action. The effects of operating Brownlee Dam and Reservoir with a TCS for compliance with current water quality standards will need to be evaluated for its effects on listed bull trout and its (proposed) critical habitat, as well as for other fish and wildlife resources that occur within and downstream of the Hells Canyon Project. To date, neither the upstream TEMP Program nor TCS operational effects to bull trout and its (proposed) critical habitat have been evaluated.

The Service's Recommendation

The Service requests and recommends that the Commission engage appropriate staff to join with all stakeholders in crafting a final licensing solution for the Hells Canyon Project.

If you agree that a renewed and focused effort by the Commission to help reach a final licensing decision for the Hells Canyon Project is appropriate at this time, please contact either Michael Morse (208) 378-5261 or Jim Esch (208) 378-5099 of my staff. The Service is prepared to assist in this process.

Sincerely,

Russell R. Holden for

Gary L. Burton, Acting State Supervisor
Idaho Fish and Wildlife Office

Enclosure

cc: CRITFC, Portland (Carter)
EPA, Seattle (Palmer)
EPA, Portland (Soscia)
IDEQ, Boise (Burnell)

IDFG, Boise (Robertson)

IPC, Boise (Randolph)

NOAA, Portland (Graves, Domingue)

ODEQ, Portland (Fonseca)

ODFW, La Grande (Fagan)

USFWS, Portland (Mead)

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION
729 NE Oregon, Suite 200, Portland, Oregon 97232
Telephone 503 238 0667
Fax 503 235 4228

November 12, 2009

Governor Theodore Kulongoski
160 State Capitol
900 Court Street
Salem, Oregon 97301-4047

Dear Governor Kulongoski:

The Columbia River Inter-Tribal Fish Commission (Commission) and two of its member tribes, the Nez Perce Tribe and the Confederated Tribes of the Umatilla Indian Reservation, have been active participants in the Hells Canyon Hydropower Project relicensing proceedings. As you may be aware, this project not only affects the current anadromous fish-bearing waters of the states of Oregon, Idaho, and Washington, but it also blocks access to miles of once-productive fish habitat and continues to negatively influence water quality above and below its dams. These are important resources that have been severely altered, resulting in a significant loss of fishing opportunity to the tribes and other citizens of the region.

The State of Oregon has been a strong advocate for improvements in the Columbia Basin hydropower system. Similarly, Oregon has become a leader in seeking changes to alleviate impacts due to climate change. With regards to the Hells Canyon Project, however, we feel that Oregon may be missing a significant opportunity to improve ecological health of the basin, correct existing water quality deficiencies, and proactively remedy some of the inevitable problems that climate change will bring to the Snake River.

Since the project directly impacts the waters of the State of Oregon, Oregon has the authority and the duty under Section 401 of the Clean Water Act to certify whether the project reasonably assures compliance with Oregon's water quality standards (401 Certification). The 401 Certification is a powerful tool whereby Oregon can seek the necessary remedies to alleviate the damage the project causes to Oregon's water quality. The tribes, together with the U.S. EPA, are concerned that Oregon is not using that tool to its maximum advantage, given what is known about current water temperature violations, the science of thermal impacts on salmon throughout the year, and the weaknesses in the Idaho Power Company mitigation plan being designed for the upper Snake basin, which will not likely address downriver water temperature violations.

The tribes have been attempting to work with the Oregon Department of Environmental Quality to develop a robust 401 Certification; however, thus far we have not been included in this process to the extent appropriate or necessary. Rather, it appears that the agency has conducted an opaque process with the project's applicant, Idaho Power Company, and that important decisions may have been made without our input.

We have attached a summary memorandum detailing our concerns with the project. We are seeking help from your office to coordinate a transparent process grounded in what measures have the potential to fully meet water quality standards in a reasonable timeframe with the state's agencies in order to fully develop a beneficial and legal 401 Certification so that fish may continue to inhabit the Snake River for decades to come.

Sincerely,

Paul Lumley
Executive Director
Columbia River Inter-Tribal Fish Commission

cc: Mike Carrier, Natural Resources Policy Director
John Kroger, Attorney General
Dick Pedersen, Oregon Department of Environmental Quality
Roy Elicker, Oregon Department of Fish and Wildlife

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TECHNICAL AND POLICY ISSUE OVERVIEW

FROM: **CRITFC Staff**
DATE: **November 13, 2009**
RE: **Hells Canyon Hydropower Complex – FERC Relicensing and 401 Water Quality Certification Processes**

I. Summary of Issues

The Hells Canyon Hydropower Project (Project) is undergoing relicensing through the Federal Energy Regulatory Commission (FERC). A key part of the relicensing requirement is for Idaho Power, the license applicant, to obtain a Clean Water Act 401 Water Quality Certificate (401 Certification) from both Idaho and Oregon, since the project straddles two states. Completion of the 401 Certification and the salmon and bull trout Endangered Species Act Biological Opinions are two of the last remaining issues related to completion of the relicensing process.

The Project has significantly altered the thermal regime of the Snake River in the area where the dams have impounded the river and below the complex. The impoundments have caused river temperatures to be warmer in the summer and fall and cooler in the winter than historical natural conditions.

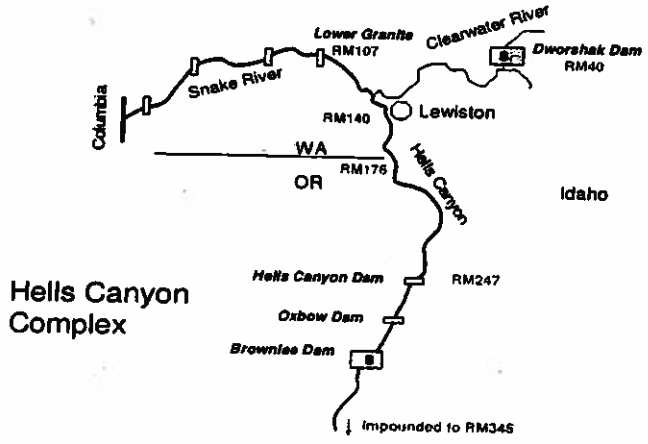

Figure 1. Map of the HCC, Clearwater and Lower Snake Rivers (EPA 2008)

These existing detrimental water temperature regimes will likely be exacerbated by climate change effects over the term of the new license. (Mantua et al. 2008; ISAB 2007). The 401 Certification process thus far has failed to consider climate change impacts on mitigation alternatives. In its latest 401 application to the Oregon and Idaho water quality agencies, Idaho Power has proposed mitigation actions that are unlikely to bring the Project into compliance with temperature standards.

Strong evidence from several independent analyses and experience from several other projects around the Northwest indicate that a temperature control structure (TCS) with selective water withdrawal at depth and located in Brownlee Reservoir, has the potential to effectively mitigate the temperature impacts of the Project. A TCS will help address temperature effects resulting from a warming planet, effects projected to be particularly challenging for inland stocks of anadromous fish and their habitat. (Mantua et al. 2008; Crozier et al. 2008). A TCS will also help to bring lower Snake River temperature regimes back to a more historical thermal regime from which salmon evolved. And finally, installation of a (TCS) in Brownlee Reservoir would add flexibility to Dworshak temperature control operations giving the region more control over cooling the lower Snake River, and more accurately and fairly assigning the cooling mitigation burden. Among other things, these changes would be beneficial to juvenile fall Chinook and steelhead growth, leading to earlier smolt emigration prior to the high summer reservoir temperatures, and reduce adult pre-spawning mortality. Both effects should contribute to greater stock productivity.

Tribal Involvement in the Process

The Nez Perce Tribe, the Confederated Tribes of the Umatilla Indian Reservation and the Columbia River Inter-Tribal Fish Commission (collectively, the Tribes) have been active in the FERC relicensing proceeding for over a decade. The Project is one of the largest in the Basin, and is significant to the Tribes as it affects tribal treaty resources and encompasses ancestral lands. Throughout the proceeding, the Tribes have repeatedly called for water quality and project operations reforms, and mitigation measures. In numerous filings, the Tribes submitted information requests and terms and conditions that were not acted upon. The Tribes also funded independent temperature modeling studies that have not been considered as part of the final decision.

The primary mitigation goals identified by the Tribes for the relicensing and 401 Water Quality Certification include meeting water quality standards within and below the Project, improving water temperature within and below the Project, improving flows in the Snake river, reducing project ramping rates to eliminate stranding juvenile salmon, creating fish passage and improving habitat above the Project.

The ability to provide more cold water to the lower Snake during important summer and fall periods from the Project would serve many purposes. It would augment the cold water from Dworshak, improve the migration and pre-spawning survival of fall Chinook and steelhead, improve the incubation survival rate for fall Chinook spawning in the Snake River below Hells Canyon Dam to Lewiston, allow earlier spawning and emergence to adjust the juvenile migration timing to match the pattern of reservoir heating.

Because this is a 40-year license with limited opportunities to reopen any decisions, current proposed measures to address the water quality problems will be insufficient to protect the future viability of the Snake River fall Chinook, summer steelhead, pacific Lamprey, white sturgeon, bull trout and other species. If current weather and temperatures remain constant during the license term, it is unlikely that Idaho Power's proposed TEMP program (non-point sources measures in the upper Snake basin) will be effective in meeting water quality standards, including narrative standards to protect the fish beneficial use below the Project, Washington states' water quality standards and Oregon's water temperature criterion of matching the historic seasonal thermal pattern of heating and cooling. The Project also will not meet the current October 23 threshold spawning temperature standard for either Oregon or Idaho.

Temperature in the Basin, however, will not remain constant during the license term. According to conservative estimates, climate change will result in significant increases in Snake River water temperatures during the next few decades. It is imperative that near-term actions are focused on remedies that will provide significant relief in this timeframe. Riparian restoration in the subbasins above Brownlee Reservoir, while important to overall habitat restoration is highly unlikely to be an effective means to reduce temperatures in the Snake River below the Project.[1] It would be desirable for future efforts to restore salmon in sub-basins such as the Weiser River, Boise River or Payette River, but the slow rate of riparian recovery and the massive scale on which this restoration would need to occur to provide effective thermal relief miles downstream to Hells Canyon Dam makes this a long-term plan for a near-term problem.

U.S. EPA Analyses

The U.S. EPA added their comments to the FERC process in 2006. The EPA noted that the Project had caused a major shift in the temperature regime of the Snake River, resulting in adverse effects on salmon and other fishery beneficial uses. The increased fall temperatures: 1) harm late migrating fall Chinook juvenile salmon on their journey to sea; 2) harm adult Chinook, Steelhead, and Sockeye migrating upriver to spawn; and 3) harm eggs in holding adults and in the gravel after deposition. In addition, cold temperatures in the winter and spring delay the emergence of Chinook salmon fry causing them to migrate downstream later in the year during harmful summertime conditions.

The EPA noted that Oregon's numeric criteria for salmon spawning is annually violated in late October to November, affecting up to 50% of spawning distribution. Summer non-spawning numeric criteria are often exceeded in July to September. (See June 2004 IDEQ/ODEQ Snake River-Hells Canyon Temperature TMDL Section 3.6). The agency noted that modeling by Idaho Power demonstrated that a temperature control structure (TCS) could improve temperatures on the Snake River below the Project. Yet the FERC did not supporting the alternative with the TCS, and there was no further analysis done on the efficacy of the TCS for the Project.

Subsequently, the Tribes detailed the technical flaws with the Geist et al., a publication funded by Idaho Power. That publication attempted to demonstrate through literature review that Snake River

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[1] In its most recently submitted (October 12, 2009) 401 Application, Idaho Power stated, relative to the uncertainty of its actions being effective and the timeframes necessary:

> *For nonpoint sources, ODEQ and IDEQ also expect that implementation plans be implemented as soon as practicable. They recognize, however, that it may take some period of time, from several years to several decades, to fully implement the appropriate nonpoint source management practices. They also recognize that it may take additional time after implementation has been accomplished before the management practices identified in the general Water Quality Management Plan or specific implementation plans become fully effective in reducing and controlling pollution. For example, riparian vegetation may take several years to develop and mature.*
>
> *In addition, ODEQ and IDEQ recognize that technology for controlling nonpoint source pollution is, in many cases, in the development stages and will likely take one or more iterations to develop effective techniques. It is possible that, after application of all reasonable best management practices, some TMDLs or their associated targets and surrogates cannot be achieved as originally established. Nevertheless, it is the expectation of both ODEQ and IDEQ that nonpoint sources make a good-faith effort to achieving their respective load allocations in the shortest practicable time.*

fall Chinook have high survival to emergence even when initial incubation temperatures are as high as 16.5°C, even though mortality was 100% at 17°C. Idaho Power used the Geist report as justification for not meeting spawning criteria in October. However, a previous study by Battelle National Laboratories demonstrated that similar temperature resulted in much higher levels of mortality than those reported by Geist. The Geist report does not explain this contradiction or even cite the prior Batelle study. We have noted other problems with the Geist study in the Tribes' comments.

In response to Idaho Power, the Tribes provided the state water quality agencies with an extensive summary of literature on effects of water temperature regimes on fall Chinook. This review shows that when fall Chinook are presented with colder water temperatures during the fall period, spawning can occur earlier than when temperatures are high. It also showed that gamete effects can be significant when pre-spawning adults are holding in high temperatures. Information is available showing that historic spawning times in the Hells Canyon reach prior to dam construction were earlier than current spawning distribution.

Idaho Power submitted a white paper entitled Groves, P.A., J.A. Chandler, and R. Myers. 2007. White paper: *The effects of the Hells Canyon Complex relative to water temperature and fall Chinook salmon.* Final Report. Hells Canyon Complex, FERC No. 1971. July 2007. The Tribes wrote a detailed and extensive technical critique of the white paper. The impacts of excessively high water temperatures throughout the life cycle have not been seriously considered by the agencies responsible (IDEQ, ODEQ, and NOAA). Only EPA recognized the extent of the current impact and the threat of even worse conditions under global climate change.

The Tribes filed copious comments on Idaho Power's submittals and consistently requested further analysis on the Project's impact on downstream waters and the potential for a TCS to improve those problems. The final EIS did not respond to the Tribes' concerns in a meaningful way.

All applicable water quality standards have yet to be addressed. Oregon's "natural season thermal pattern" (NSTP) criteria applies to the Snake River downstream of the Hells Canyon dam. EPA's analysis indicated that the fall thermal shift caused by the Project results in these standards being exceeded by approximately 3°C from early September until late October.[2]

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[2] Based on a simple comparison between temperatures that inflow and outflow the Project (i.e., the observed temperature impact), the Project causes the Snake River to be 3.4°C warmer in late October (October 23 – 29). Data indicate that the 3.4°C observed impact of the Project is not related to inflowing summer temperatures or annual flow. The 3.4°C average observed Project impact is consistent year-to-year and does not vary depending on summer inflow temperature or annual flow. Data in do indicate that during high flow years and during years with cooler summer inflow temperatures the inflow temperatures to the Project, and resultant outflow temperatures, are cooler. The 3.4°C average impact of the Project does not change. During the high flow years (1996-1999, 2006), the Project inflow and outflow temperature is lower that during low flow years (2000-2005), but the Project observed impact remains about the same. In fact, during the high flow years, the Project impact is slightly greater (3.6°C for high flow years versus 3.4°C for low flow years). These data clearly indicate that the Project is solely responsible for the 3.4°C increase in Snake River temperatures observed in late October:

Table 1
Estimated HCC Impact Based on a Comparison between Upstream and Downstream Temperatures
All values are 7DADM for 7days leading to October 29

Average for:			
Low Flow Years	12.3	15.7	3.4
High Flow Years	10.8	14.4	3.6

Oregon adopted the NSTP standard based on the 2003 EPA Region 10 Temperature Guidance. The Guidance along with EPA's documentation in support of its approval of Oregon's NSTP is clearly focused on maintaining and restoring a natural cooling pattern in the late-summer and fall in the Columbia and Snake Rivers to protect salmon uses during this period. The NSTP, like other narrative standards, is translated into numeric form in specific CWA applications, such as this 401 certification.

A second standard omitted from the EIS analysis is Washington's criterion that no temperature increases, at any time, exceed 0.3°C due to any single source or 1.1°C from all sources combined. This criterion applies at the Washington border downstream of Hells Canyon dam. EPA's current information indicates that the Project impact in the fall violates this standard.

Because of the multiple processes involved, a mathematical model of the reservoir would be the best tool to isolate and analyze the effect of a change in summer inflow temperatures on the temperature of the water leaving the Project in the fall. Idaho Power has developed and used a CE-QUAL-W2 model of this reservoir in this re-licensing process. However, Idaho Power has elected not to use the model for the TEMP analysis. The Tribes gathered funds for two technical studies by hydrologic engineers at Portland State University, using the CE-QUAL-W2 model and more simple mass balance equations, to evaluate the technical feasibility of the Idaho Power's TEMP proposal. This proposal would address water temperature violations below the Project by implementing a series of upriver actions. These actions would potentially occur in sub basins such as the Boise, Owyhee, Burnt, Powder, and Payette river sub-basins. These actions are essentially stream and riparian restoration actions and a certain amount of cloud seeding to produce higher snowpack levels in these basins. We present a discussion of these analyses in Section II below.

II. Technical Background: Temperature, PSU Studies, EPA Analyses, and Temperature Control Structure

The Clean Water Act uses numeric and narrative criteria in order to protect the designated and existing uses of a water body. In the Snake River, temperature criteria have been developed to protect designated temperature-sensitive beneficial uses, including specific salmonid life cycle stages, when and where those uses occur. Both Oregon and Idaho have a seven-day average maximum of 20.0 °C for protection of the aquatic life and salmon and steelhead migration corridor beneficial uses and a seven-day average maximum of 13.0 °C for protection of the salmonid spawning beneficial use.

States may also grant a "load" allocation of a parameter to dischargers along waterways. For the Snake River, Oregon and Idaho have issued Idaho Power Company (Idaho Power) a load allocation for the outflow from Hells Canyon Dam. This allocation includes: maximum weekly temperature of 13.0 °C when inflow temperature to Brownlee Reservoir, defined as site potential in the Snake River-Hells Canyon TMDL, is less than a maximum weekly maximum temperature of 13.0 °C or no more than a 0.14 °C increase in water temperature when site potential is greater than a maximum weekly maximum temperature. Oregon standards require that the seasonal thermal pattern in the Snake River must reflect the natural seasonal thermal pattern (OAR 340-041-0028(4)(d)).

The Snake River naturally experiences a great variation in water temperatures, particularly between changing seasons. The fish adapted to this natural regime and their life histories reflected this adaptation. With anthropogenic changes to the river basin, including construction of dams, that life

history has been dramatically affected. The variability of the river's temperature has also changed, and accordingly has affected life histories of such fish species as Snake River ESA listed fall Chinook and steelhead, including B-run steelhead.[3] The change in temperatures may also have a negative effect on Pacific lamprey with recent returns to Lower Granite dam reduced to a few dozen adults (CRITFC 2008).

Specifically, the thermal shift caused by the Hells Canyon Project (Project) has produced unnaturally cool water in the spring and early summer, and unnaturally warm water in the late summer and fall. This includes a 2- to 3-week persistence of high water temperatures that likely contributes to pre-spawning mortality of Chinook and steelhead and has delayed Snake River fall Chinook spawning (EPA 2008; McGie 1998; McCullough 1999). On the other hand, cool water released by the Project in the spring retards the growth of juvenile Chinook and steelhead, likely reducing their migration and survival through the federal hydropower system. Warm water from the HCC in the late spring and summer negatively impacts out migrating juvenile fall Chinook and steelhead and returning adult fall Chinook and steelhead. Connor et al. (2002) noted that dam construction in the Snake River shifted fall Chinook production to areas with relatively cooler water temperatures and relatively lower growth opportunities.

In order to alleviate the temperature problems in the Snake River basin, particularly in Lower Granite reservoir, federal managers use a temperature control structure on Dworshak dam to release cold water into the Clearwater River. (Figure 1; Karr et al. 1999). While these cold water releases have generally been effective in reducing temperatures in the Lower Snake below the Clearwater River, they have caused some unexpected negative results to juvenile Clearwater fall Chinook and B-run steelhead that are naturally produced in the Clearwater and also produced at Dworshak Hatchery (Connor et al 2003a; Connor et al. 2003b). If these cold water releases were curbed during certain times of the year, then these effects to Clearwater stocks would decrease, however water temperatures in the main Snake River would continue to be a problem. The answer may be to augment the system with cool water from the Hells Canyon complex.

Installing and operating a Brownlee TCS would increase system wide abilities to meet water temperature standards. It would reduce the warm summer temperatures through and below the Project, reducing the need for extremely cold water to be released from Dworshak, while still meeting the 68° F degree target at Lower Granite Dam.

EPA, in its April 9, 2009 letter to IDEQ and ODEQ, noted that the Project causes the Snake River to be approximately 3.4°C warmer from mid-September through October. This level of impact extends from Hells Canyon Dam (RM 247) to the confluence with the Salmon River (RM 188). The warm water from the Project continues and enters the State of Washington. During the September through October period when the HCC increases the temperature of the Snake River, the Washington temperature standard requires that the Project impact at river mile 176 to be no more than 0.3°C. Based

[3] Incorporating four viability salmon population parameters (VSP: abundance, productivity, spatial structure and diversity), the Interior Columbia Technical Recovery Team (2006) convened by NOAA Fisheries found that Snake River fall Chinook needed a 38-69% improvement over existing conditions to achieve a 99% chance of meeting abundance and productivity VSP parameters necessary to avoid extinction. The Team found that B-run Snake River steelhead needed a 65% improvement over existing conditions to achieve a 99% chance of abundance and productivity VSP parameters necessary to avoid extinction. B-run steelhead abundance is only about one tenth that of A-run steelhead. CRITFC's member tribes' fisheries on fall Chinook are considerably constrained by low numbers of B-run steelhead.

on a comparison of Snake River temperatures upstream of the Project and downstream at different locations extending to the Washington border, the impact of the Project at the river mile 176 is estimated to be 2.8°C from mid-September through mid-October and a little less in early September and late October.

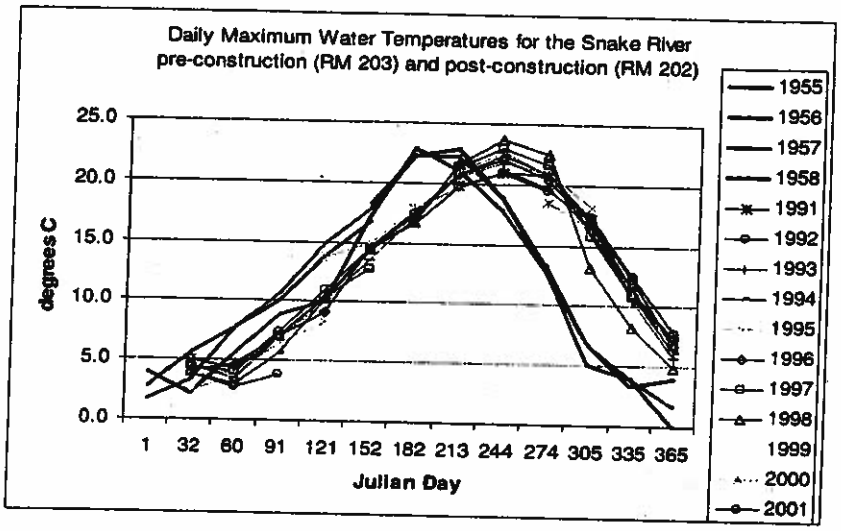

Figure 2. Snake River temperatures before and after construction of the HCC (EPA 2008).

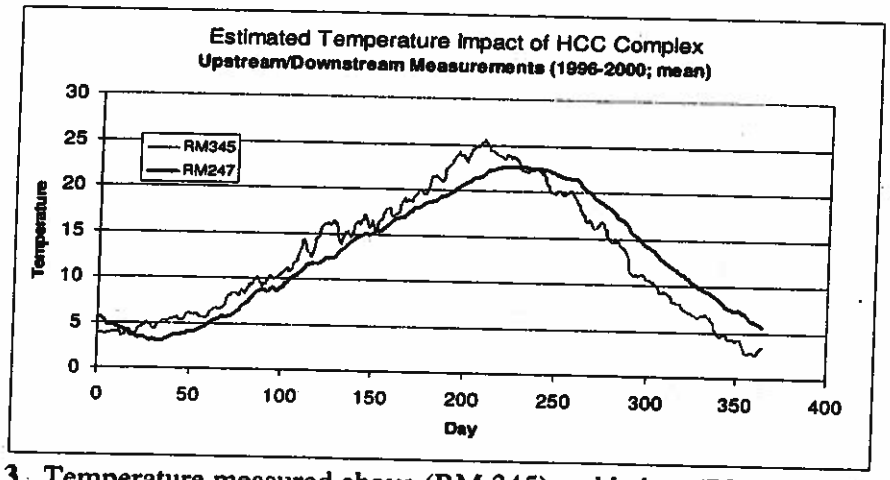

Figure 3. Temperature measured above (RM 345) and below (RM 247) the HCC (from EPA 2008).

Idaho Power Company Approach

To address these temperature issues to meet the Lower Snake River TMDL and 401 Certification requirements, Idaho Power has filed three 401 applications with IDEQ and ODEQ. The first two were rejected by the agencies while the third was recently submitted and is undergoing review. Idaho Power has proposed two primary mitigation actions:

- Cloud seeding to increase snowpack and water inputs into the Project
- Riparian restoration in tributaries above the Project and buy out of water rights in areas above the Project (i.e., TEMP program)

The EPA and the Tribes, with technical assistance from Portland State University, have reviewed in detail all of the Idaho Power 401 applications. They found that the Idaho Power mitigation actions will not likely reduce temperatures from the Complex to the extent necessary to meet the Lower Snake TMDL and protect salmon and steelhead and Pacific lamprey.

Neither Idaho Power nor the state water quality agencies address climate change and its potential for significant effects to the Snake River. These effects include reduced snowpack and summer flows and increased temperatures projected by leading scientific groups and scientific reports. [4] If these concerns were addressed, they would likely negate even the most liberal assumptions from the proposed Idaho Power mitigation actions during the 40 year FERC license term (Figures 4-6).

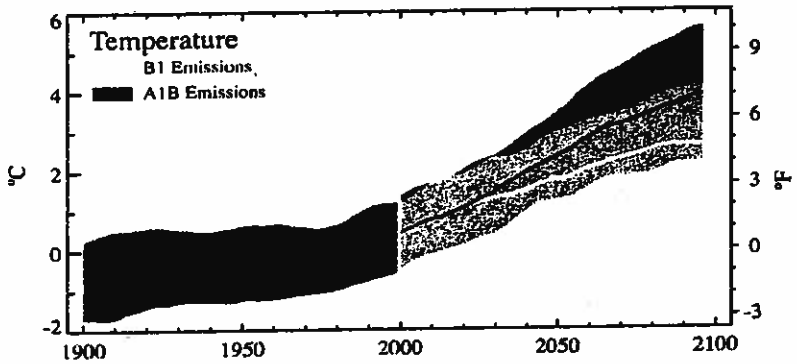

Figure 4. Projected average air temperature increases in the Pacific Northwest under two carbon emissions scenarios (Mote and Salathe 2008). Global carbon emissions have already exceeded those assumed for the B1 scenario.

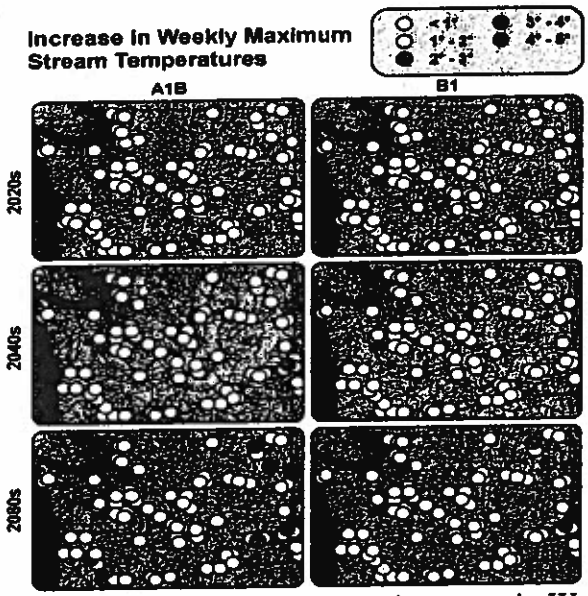

Figure 5. Projected future water temperature increases in Washington State including the lower Snake River under two carbon emissions scenarios (Mantua et al. 2009).

[4] University of Washington Climate Impacts Group (Mote and Salathe 2008; Mantua et al. 2009); Western Governors Association's Western Climate Initiative (2008), the Independent Scientific Advisory Board (ISAB 2007-2) and the Oregon Global Warming Commission (2008).

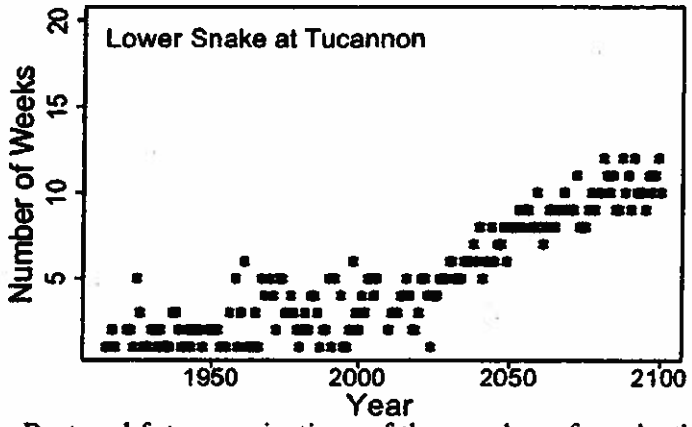

Figure 6. Past and future projections of the number of weeks that water temperatures exceed 21 degrees C (i.e. lethal threshold for salmon; Mantua et al. 2009).

Cloud Seeding as Mitigation

Idaho Power has also proposed to use cloud seeding as a mechanism to bring more rain, and in effect, temperature reduction benefit, to the system. The Tribes submitted comments noting that there was considerable uncertainty about the effectiveness of the method to increase precipitation, especially in an era of rapid climate destabilization. The Tribes' comments noted:

- While there is statistical evidence of an increase of precipitation, the exact physical mechanisms are not fully known, nor the outside-of-area impacts (American Meterological Society 1998)

- Against the background of 50+ years of experimentation with cloud seeding, many questions still remain, and progress has been frustratingly slow due to the limitations in understanding of the complex physical processes involved, insufficient design of some experiments, and political, scientific, and funding pressures." The biggest concern: The transferability of results from simple cloud systems to larger, more complex storm systems that contribute significantly to area-wide precipitation.

- Cloud-seeding for extra precipitation is not magic – research indicates there are consequences to areas downwind of the target area. Our prevailing westerly airflow carries moisture aloft that may become mountain snow. However, if one taps into that source, then there is a probability that watersheds in downwind areas may have reduced precipitation. Thus, the Idaho Power proposal could have negative impacts to the Salmon Basin and other areas.

(CRITFC Comments to IDEQ and ODEQ, April 23, 2009).

Riparian Restoration as Mitigation

With respect to riparian restoration in tributaries above the Project reducing Snake River temperature entering and leaving the Project, the EPA and the Tribes and their consultant, Portland State

University, requested scientific evidence from Idaho Power and the water quality agencies that a cool water signal from the riparian areas would reach the Project and continue below the Project. Idaho Power and the agencies have thus far failed to produce such evidence.[5] On the other hand, the Tribes and EPA, using both one dimensional, two dimensional and simple mass balance models, demonstrated that even under the most liberal assumptions,[6] cool water produced by riparian improvements above the Project would be significantly reduced by the time the water reached Brownlee Reservoir (Figures 7, 8). The water quality agencies have not addressed this key issue.

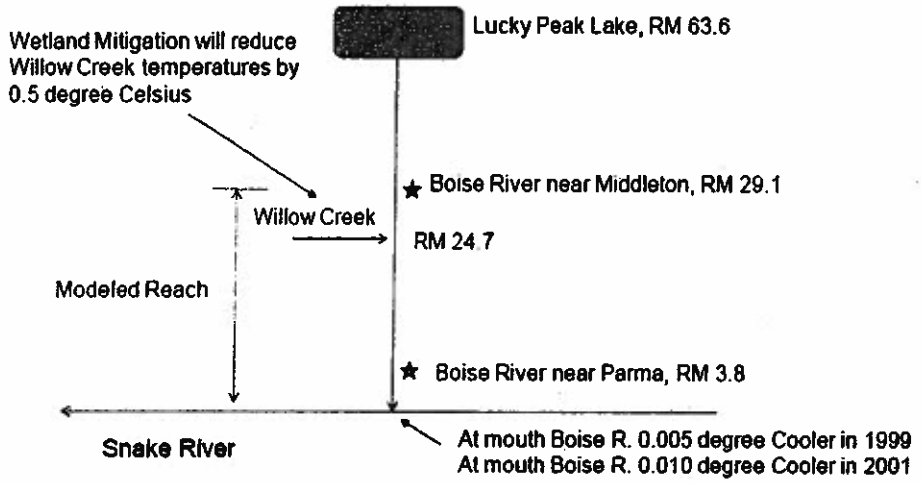

Figure 7. Modeled reduction in Boise River temperatures from riparian habitat improvements and estimated cooling effects downstream (Berger et al. 2009).

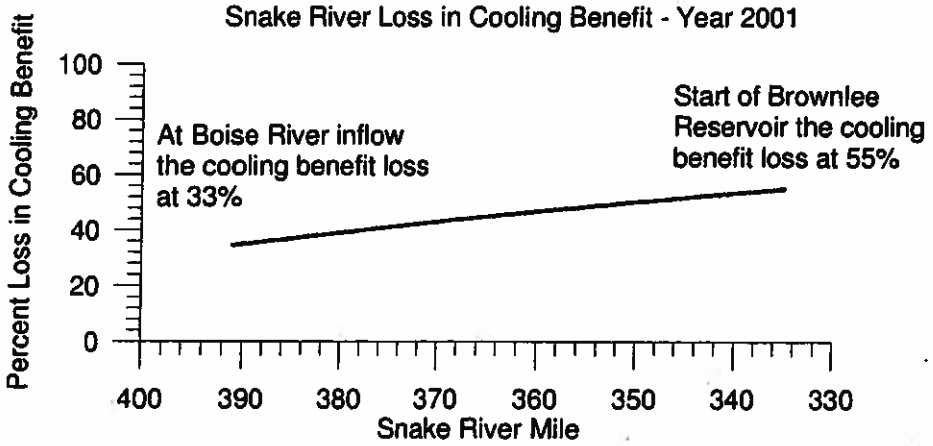

Figure 8. Modeled projection of loss of cool water created by riparian improvements in the Boise river downstream (Berger et al. 2009).

[5] Despite formal requests from EPA and tribal entities that Idaho Power use its CE-Qual-W2 temperature model of the Project to estimate thermal benefits from riparian restoration and cloud seeding, Idaho Power has refused to undertake the analysis. In its last 401 submittal to the water quality agencies, Idaho Power claims that such modeling as performed by Portland State University is uncertain and too difficult to undertake, yet there provided no substantive comments.

[6] The assumptions included maximum cooling benefits derived from riparian restoration actions that would take place in the immediate present. In reality, it could be decades before the riparian restoration actions are fully realized (Budy and Schaller 2008).

Findings of the PSU Studies

A technical report produced in May 2009 by Dr. Chris Berger, Dr. Scott Wells, and Andrew McCulla of Portland State University, titled "The Impact of Idaho Power Company's Proposed Temperature Mitigation Projects on Temperatures in the Boise River and Snake River," (Berger et al. 2009) evaluated the ability of Idaho Power's proposed riparian restoration projects to generate enough water temperature cooling that its effects would appear downstream in the Snake River where it is needed.

A simulated riparian project conducted at River Mile 29 in the Boise River for 1999 was shown to lose 23% of the cooling benefit in its flow downstream to the mouth of the Boise River. By the time the flow from this mitigation project reaches the head of Brownlee Reservoir, the cooling benefit loss reaches 48%. In 2001 the cooling benefit loss for the same mitigation project would be 33% at the mouth of the Boise River and 55% at the head of Brownlee Reservoir. There is an additional cooling benefit loss from the head of Brownlee Reservoir to Oxbow Reservoir and then Hells Canyon Reservoir to below dam where the temperature standards must be met.

The full magnitude of this loss could be calculated with a state-of-the-art river temperature model (CE-QUAL-W2) developed by Dr. Scott Wells. Dr. Wells had conducted earlier modeling work for the Snake River for Idaho Power but was prevented by Idaho Power from using the data to run this model for evaluation of Idaho Power's upstream mitigation proposal. The Tribes were refused access to necessary data that would make calculations of the effects of the Project feasible.

Ttechnical analysis generated by Idaho Power does not include any consideration for attenuation of the cooling benefit as the water flows downstream. Idaho Power's failure to assess attenuation results in a much smaller scope for the riparian restoration effort needed to meet water temperature standards. Additionally, Idaho Power has thus far refused to conduct a robust technical analysis itself, or with PSU's assistance using the CE-QUAL model, to determine the ability to meet water temperature standards using riparian restoration.

A second major problem with the Idaho Power approach is that their ability to conduct any known amount of riparian restoration is highly speculative. There may be very little opportunity due to private land issues for Idaho Power to do any meaningful riparian restoration. Also as mentioned above, Idaho Power also relies on cloud seeding to provide greater snowpack. Although this technology has been tried for years, it has always remained a practice with uncertain results.

In September 2009, PSU produced a second report entitled "Brownlee Reservoir Cold Water Analysis and Downstream Impact of Cooler Water Temperatures Released from Hells Canyon Dam." This report asks the questions: (1) how much cold water is available in Brownlee Reservoir in various types of years (low to high flows, low to high air temperatures); (2) to what extent can this water be used to meet temperature criteria below Hells Canyon dam, and; (3) how much cooling benefit from water passing below Hells Canyon dam can still be detected at the head of Lower Granite Reservoir?

The conclusions of this second PSU study for three case study years showed that in two of three years there was enough cold water in Brownlee Reservoir to fully meet downstream temperature requirements below the Project. In the other year the temperature requirements were partially met. For cold water released below the Project, there was significant cooling benefits to the upper end of Lower Granite Reservoir.. The potential for this cooling to augment the benefits from Dworshak is significant.

Viable Temperature Mitigation – A Temperature Control Structure (TCS)

Temperature control structures (TCS) have or are being successfully installed at various projects around the region, and are resulting in significant temperature cooling in many rivers in the Northwest (i.e. Shasta Dam, Dworshak Dam, Pelton Dam, Cougar Dam). In watersheds with large storage reservoirs there are opportunities to change reservoir operations in ways that mitigate the impacts of climate change. For example, strategic use of cold-water releases may be able to mitigate climate change impacts on summer water temperature and seasonally low stream flow at key times (Mantua et al. 2009; ISAB 2007).

The PSU study used mass balance equations to determine the volume of cool water available from Brownlee Reservoir that could be used in a TCS (Figure 9; McCulla et al. in review). They determined that more cool water would be available in warmer, low flow years than in cooler high flow years. For two of the three years analyzed, there was enough cold water in the hypolimnion of Brownlee Reservoir to fully meet downstream temperature requirements. In one year of the three evaluated, water temperature needs were partially met from the hypolimnetic volume available.

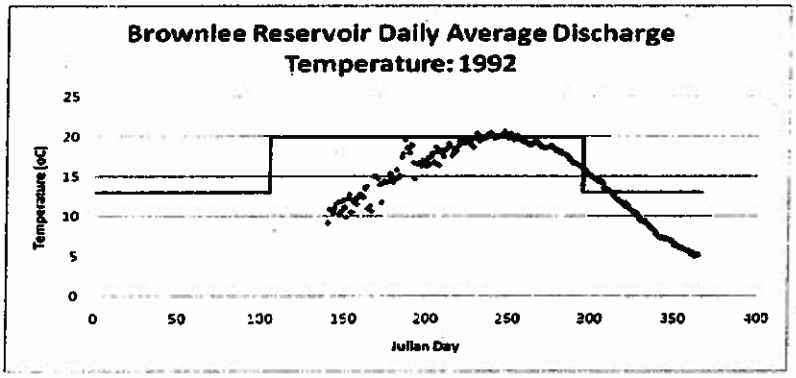

Figure 9. Daily average discharge temperatures from Brownlee Reservoir turbines at depth in 1992, a low flow, warm year (McCulla et al. in review).

In the FERC relicensing proceeding, Idaho Power evaluated the potential for several different TCS options to alter the current temperature regime downstream of the Project. In a series of reports provided to FERC in 2005 (AIR WQ-2 reports), Idaho Power focused on the potential to reduce summer temperatures and meet the October 23 spawning temperature criteria. In these reports, Idaho Power concluded that the spawning criteria could be obtained with several TCS options under different flow years, but doing so could cause negative thermal effects other times of the year. Based on these results, Idaho Power decided not to include a TCS in its proposed action or 401application.

At the request of ODEQ, Idaho Power completed model runs in 2005 that evaluated the potential to cool late-summer/fall temperatures without causing detrimental temperature conditions other times of the year. These model outputs, which were not included in the FERC reports, demonstrated that a TCS could cool late-summer/fall temperatures without causing problematic temperatures other times of the year. Further, the model output showed the potential to correct the fall shift in temperatures caused by the Project and restore a more natural late-summer fall cooling pattern.

The 35kcfs Tower model output at Brownlee Dam depicts the potential of a TCS to cool late-summer/fall temperatures (Figure 10). Temperatures below the Project can be cooled by a TCS starting

in early September through early November by an average of 3°C. This temperature reduction is roughly equal to the temperature increase caused by the Project during this period. Generally, more cool water is available during warm, low flow years than cooler, higher flow years.

Figure 3. Low Water Year, 35 kcfs Tower, modeled Hells Canyon hourly outflow temperatures.

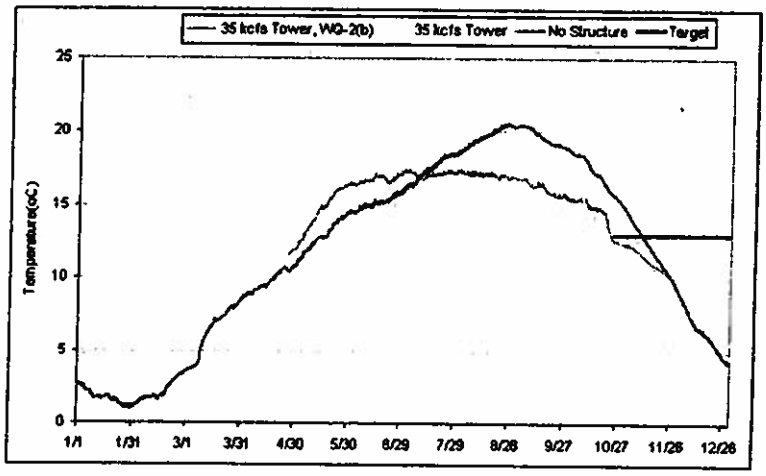

Figure 10. Modeled temperature cooling with a TCS at Brownlee Reservoir (Idaho Power 2005).

The next issue that was addressed was how far downstream cool water generated by a TCS at Brownlee would travel. EPA modeling compared the temperature profile for the Snake River downstream of the Project under current conditions to what could be obtained with a TCS during the first two weeks of September. They found that temperatures for the 100-mile reach between the Project (rm 236) and the Clearwater River confluence at Lewiston (rm 135) could be reduced from the 20-21°C range to the 18-18.5°C range during the first two weeks of September (Figure 11). Lowering temperature below the 19.5- 20°C threshold may be significant in reducing the risk of adult pre-spawning mortality and reducing egg/fry mortality of spawned eggs. Additionally, a similar 3°C reduction can be obtained with a TCS for the latter two weeks in September through October for the 100 mile reach below the Project. A more natural seasonal cooling pattern in the reach could be restored with a TCS, which would create more suitable habitat for salmon and Pacific lamprey.

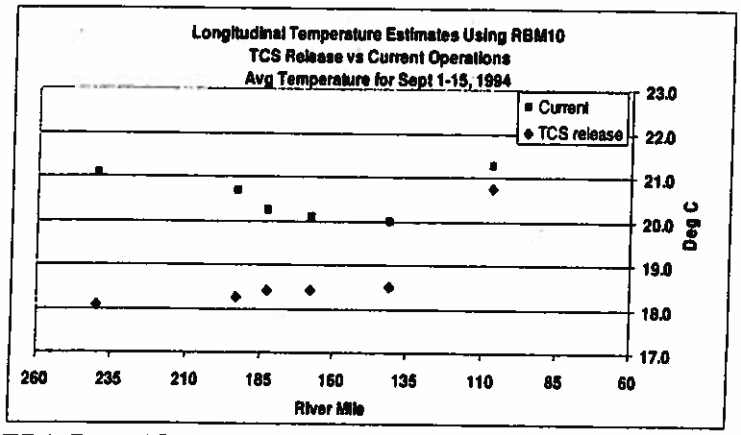

Figure 11. EPA RBM10 model results showing cool water from the HCC reaching the lower Snake River 100 miles below (Cope 2006).

In separate analyses, PSU researchers corroborated the EPA findings that cool water released from Hells Canyon Dam has significant temperature reduction effects on the Snake River between Hells Canyon Dam and the upstream end of Lower Granite Dam (a 100-mile reach). Based on two representative study years, the cool water benefit of thermal reductions emanating from Hells Canyon Dam caused from releasing cold hypolimnetic water from Brownlee Reservoir was reduced only by 39 to 50% by the time this water volume reached the head of Lower Granite Reservoir (Figure 12).

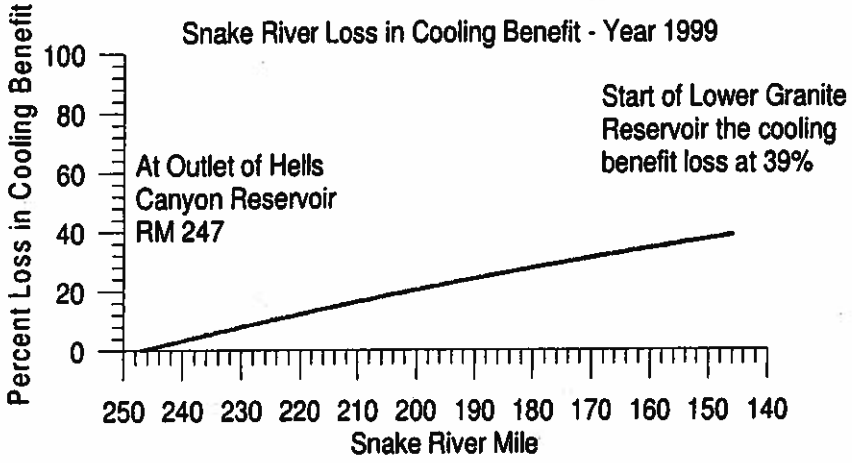

Figure 12. Estimated loss of cool water between HCC and Lower Granite Reservoir for1999, a high flow year (McCulloch et al. in review)

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http://cses.washington.edu/db/pubs/allpubs.shtml

III. Idaho Power's October 12, 2009 401 Certification Application

Idaho Power Company released its revised 401 application on October 12, 2009. Excerpts from this release are examined below:

> *IPC has been doing business in the Snake River watershed since 1916 and now owns and operates 17 hydroelectric projects within the watershed, providing electric service to in excess of 480,000 customers. Thus, IPC is a stakeholder in the watershed and, over the last century, has developed valuable partnerships and relationships within the watershed. Moreover, as IPC's hydro projects run from American Falls (RM 714.0) to Hells Canyon (RM 247.6), IPC has had a consistent presence on the Snake River. Due to the necessity to license the projects under the Federal Power Act and associated federal statutes, IPC has, over time, developed perhaps the best overall science and data on water quality and habitat issues.*

This statement illustrates that Idaho Power is responsible for much of the background thermal increases in the Snake River and that these water quality impacts have been present for nearly 100 years. Idaho Power has elsewhere blamed high background temperatures entering Brownlee Reservoir on upstream users, but much of that burden is theirs. Idaho Power then paints the Project as providing both a beneficial temperature effect on the Snake River below the Project and a benign effect. As noted above, Idaho Power has refused to share its data to allow others to validate its science claims. In its

new 401 Certification application, Idaho Power continues to argue that its white paper proves that the thermal impacts are benign. See quote below:

> *IPC analysis and data demonstrate that the temperature effects of the HCC are benign and, in fact, may be beneficial to species downstream of the HCC, particularly fall Chinook salmon. See: White Paper: The Effects of Hells Canyon Complex Relative to Water Temperature and Fall Chinook Salmon (IPC 2007), filed with the FERC on July 30, 2007.*

The content of this white paper was extensively evaluated and disputed by reference to substantial literature and analysis by the Tribes. Our findings were that in all parts of the fall Chinook life cycle, the thermal effects from the Project are damaging to fall Chinook and could be significantly improved by use of a temperature control structure on Brownlee Dam.

Idaho Power does acknowledge that climate change will increase the temperature problems caused by the Project already:

> *In general, CIG modeling suggests a future rate of warming in the Pacific Northwest of approximately 0.5 °F (0.3 °C) per decade through at least 2050, relative to 1979 to 1999 temperatures. Most of this temperature increase is projected to take place in the summer months, June through August. The CIG study also suggests that southern Idaho's Snake River basin is at greater risk of impacts from climate change than the rest of the Columbia River basin because the Snake River is proportionally more developed with greater depletions to stream flow. (USBOR 2007, pg. 46.)*

Idaho Power acknowledges that it has used CE-QUAL for high quality temperature modeling in the past:

> *The CE-QUAL-W2 Model, Version 3.1 (Cole and Wells 2002) was used to model water quality conditions through the HCC (see Exhibit 6.1-3 for background on HCC temperature modeling). Using these models the sensitivity of HCC outflow temperatures to changes in inflow temperature and flow were explored to expand on the previous simplified relationships between inflow and outflow conditions (see Figures 6.1-8 and 6.1-9).*

However, Idaho Power refuses to use this model now to evaluate the ability of a specific amount of upstream habitat restoration to result in improved water temperatures below the Project. Idaho Power dismisses, without directly referring to, the technical analyses done by PSU (Berger, Wells, and McCulla). Regarding the issue of attenuation of a cooling benefit over the water flow path from a riparian restoration site downstream to Brownlee Reservoir and then to Hells Canyon Dam, Idaho Power makes the assertion:

> *Another approach to account for attenuation through the watershed could be watershed modeling. However, attempting to provide, using currently available model applications, a realistic approximation of the cumulative downstream benefits after full implementation of the TEMP and other watershed improvement projects could be misleading. To develop a watershed model capable of assessing the future temperature improvements in the Snake River above the HCC would likely require a disproportionate expenditure of resources given the inherent limitations of what any such potential model could deliver, and would significantly delay implementation of the TEMP. The other practical limitations are also imposing. Throughout any such effort, consensus on the modeling would be difficult to reach, and the reliability of the model would be suspect due to the constantly changing variables over so vast an area. A real world comparison of effort is illustrative. IPC's models of the HCC reservoirs were under continuous development from 1995 to 2005 (see Exhibit 6.1-3). These models address approximately 30 square miles of surface water. The Snake River watershed as a whole covers an area of approximately 73,000 square miles.*

It appears that Idaho Power has no interest in making use now of the mainstem temperature model that it employed with the guidance of Portland State University experts for its earlier mainstem

flow/temperature analysis. This model, in combination with other system temperature models such as EPA's RBM-10, is still the best technical tool for examining the potential attenuation of a cooling benefit in the mainstem or also down the tributaries leading into the Snake. However, if it is to be used, the Tribes need to insist that it be done in a fully disclosed, public process, including scientific peer review. Currently Idaho Power has been able to control all data and analysis so that not even the states have an ability to check technical adequacy. Idaho Power fails to disclose the level of effectiveness of its TEMP project, the uncertainty in degree of applicability of sufficient projects, and the attenuation of benefits by referring to a highly complex watershed analysis that would have to be done. So what remains is a plan based on unsubstantiated conjecture.

IV. Conclusion

Idaho Power's proposed mitigation to address temperature effects of the Project in its October 2009 401 Water Quality Certification submittal is insufficient to meet numeric and narrative state water quality standards below the Project. This finding is based on the findings of Idaho Power, EPA, the Tribes and Portland State University. Given the shortcomings of the Idaho Power proposal, it is unclear how the state DEQs can issue 401 Certifications that the proposed operations of the Project will not result in continuing violations of applicable water quality standards. The failure of Idaho Power (and the state DEQ's) to address the temperature problem in a meaningful way will expose fall Chinook and other species to at least 40 more years of elevated and harmful water temperatures.

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